

-5-

REMARKS

The Examiner has rejected Claims 1-3, 6-9, 12-14, and 16-24 under 35 U.S.C. 103(a) as being unpatentable over Greene et al. ("Hierarchical Z-Buffer Visibility") in view of Dehmlow et al. (U.S. Patent No. 5,999,187). Applicant respectfully disagrees with this rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed.Cir.1991).

With respect to the first element of the *prima facie* case of obviousness and, in particular, the obviousness of combining the aforementioned references, the Examiner argues that it would have been obvious to update the far clipping plane because it improves the z-buffer resolution and accuracy of graphics selection. To the contrary, applicant respectfully asserts that it would not have been obvious to combine the teachings of the Greene and Dehmlow references, especially in view of the vast evidence to the contrary.

Specifically, Dehmlow relates to a computer aided design (CAD) system, while Greene relates to a visibility algorithm. To simply glean features from a CAD system, which aids in the creation and display of objects on a computer (such as in Dehmlow), and combine the same with the *non-analogous art* of visibility algorithms (such as in Greene), would simply be improper. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent

-6-

to the particular problem with which the inventor was concerned." In *re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also In *re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); In *re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992) In view of the vastly different types of problems a CAD system addresses as opposed to a visibility algorithm, the Examiner's proposed combination is inappropriate.

More importantly, with respect to the third element of the *prima facie* case of obviousness, the Examiner has not even addressed applicant's previously amended claim language, as set forth below:

"...said system comprising means for updating said far clipping plane based on the farthest depth value in a z-pyramid, if the farthest depth value in the z-pyramid is nearer than a depth of the far clipping plane" (emphasis added - see the same or similar, but not necessarily identical language in each of the independent claims).

Further, in the latest Office Action of 10/06/05, the Examiner merely points to page 2, col. 2 to page 3, col. 1 (section 3.1) from Greene to make a prior art showing of applicant's claimed "z-pyramid." Applicant contends, however, that the mere mention of a "z-pyramid" in Greene in no way meets applicant's claimed functionality surrounding a z-pyramid, namely, updating a far clipping plane based on the farthest depth value in a z-pyramid, if the farthest depth value in the z-pyramid is nearer than a depth of the far clipping plane, as claimed.

Applicant respectfully asserts that neither the Greene nor Dehmlow reference teach that the far clipping plane is updated substantially based on a farthest depth value which is included in a z-pyramid, in the manner claimed by applicant. In fact, Dehmlow teaches that "far clipping planes are positioned dynamically based on the part(s)...that are present within the five-point view frustum boundary 714" (see Col. 12, lines 43-46). Clearly, simply suggesting that a far clipping plane be within a five-point view frustum boundary, as in Dehmlow, does not meet and even *teaches*

-7-

away from a farthest depth value included in a z-pyramid, in the manner claimed by applicant.

Still yet, as mentioned hereinabove, the Examiner has failed to make a prior art showing of applicant's claimed condition upon which the claimed updating is based, namely if the farthest depth value in the z-pyramid is nearer than a depth of the far clipping plane, as claimed. Only applicant teaches and claims a far clipping plane that is updated substantially based on a farthest depth value in a z-pyramid conditionally upon the aforementioned specific criteria associated with the z-pyramid.

Again, for the reasons set forth above, applicant finds it improper for the Examiner to support his rejection by simply pointing to the disclosure of a "z-pyramid" in a vacuum in Greene, and the disclosure in Dehmlow merely suggesting that a far clipping plane be within a five-point view frustum boundary. These two disclosures, when combined, do not together meet applicant's claim language, as noted above.

Applicant respectfully asserts that at least the first and third elements of the *prima facie* case of obviousness have not been met, since the Examiner's proposed modification would not be obvious and further the prior art references, when combined, fail to teach or suggest all the claim limitations. A notice of allowance or a specific prior art showing of each of applicant's claimed elements, in combination with the remaining claimed features, is respectfully requested.

Applicant further notes that the prior art is also deficient with respect to the dependent claims. For example, with respect to Claim 16, the Examiner has relied on the following excerpts from Dehmlow to make a prior art showing of applicant's claimed technique "wherein the updating includes resetting the far clipping plane to the farthest depth value."

"In another embodiment the near and far clipping planes are positioned dynamically based on the part(s) (i.e. the cells that have non-null cell-to-art mappings) that are present

-8-

within the five-point view frustum boundary 714. The near and far clipping planes are positioned as close to the part(s) as possible without actually clipping any of the part(s) from the resulting image that is generated. This clip plane "clamping" reduces the distance between the clipping planes and improves the z-buffer resolution of the graphics system. This in turn improves the accuracy of the graphics selection mechanism. Furthermore, surfaces that are close together are displayed more precisely (with respect to how the surfaces occlude each other). The actual position of the clipping planes is determined after the cells have been sorted in order of distance from the virtual camera and before any primitives are sent to the graphics system for rendering. The closest point on the closest cell (with a non-null cell-to-part mapping) to the virtual camera is used to position the near clipping plane. In a similar fashion, the farthest point on the farthest cell (again with a non-null cell-to-part mapping) is used to position the far clipping plane. Since the cells are already sorted for the subsequent scene processing, this procedure can be used at interactive frame rates." (Col. 12, lines 49-53)

Applicant respectfully disagrees, as the Examiner has not taken the forgoing claim language of Claim 16 into context. Specifically, the claimed "farthest depth value" is specifically included in a z-pyramid, as set forth in intervening Claim 1. Thus, at least for the reasons set forth with respect to the independent claims, at least the first and third elements of the *prima facie* case of obviousness have not been met, since the Examiner's proposed modification would not be obvious and further the prior art references, when combined, fail to teach or suggest all the claim limitations.

As yet another example, with respect to Claims 20-21, the Examiner has relied on page 3, col. 2, and page 5, col. 2 from Greene make a prior art showing of applicant's claimed technique "wherein the tip of the z-pyramid includes a low-resolution z-pyramid with lower resolution than another z-pyramid maintained by a culling stage of the graphics system" (see Claim 20) and "wherein the tip of the z-pyramid includes a low-resolution z-pyramid with lower resolution than another z-pyramid maintained by a hierarchical rendering stage of the graphics system" (see Claim 21).

Applicant respectfully disagrees with this assertion. Specifically, Greene merely makes the mention of a z-pyramid with coarse and fine levels within the

-9-

same z-pyramid. In sharp contrast, applicant teaches and claims a low-resolution z-pyramid with lower resolution than another z-pyramid maintained by a culling stage or hierarchical rendering stage of the graphics system. Only applicant teaches and claims updating a far clipping plane based on the farthest depth value in a z-pyramid that has a lower resolution with respect to another z-pyramid maintained by a culling stage or hierarchical rendering stage of the graphics system, as claimed.

Still yet, the Examiner merely dismisses the following subject matter of Claims 22-23 as being well known in the art: “wherein depth values of the z-pyramid are encoded” (see Claim 22), and “wherein the depth values of the z-pyramid are encoded for reducing storage requirements thereof” (see Claim 23). Applicant respectfully disagrees, as only applicant teaches and claims such encoding in the specific context of depth values of the z-pyramid, in the context claimed, for improved updating and/or related processing.

Thus, with respect to Claims 22-23, it appears that the Examiner has simply dismissed the same under Official Notice. In response, applicant again points out the remarks above that clearly show the manner in which some of such claims further distinguish the prior art references of record. Applicant thus formally requests a specific showing of the subject matter in ALL of the claims in any future action. Note excerpt from MPEP below.

“If the applicant traverses such an [Official Notice] assertion the examiner should cite a reference in support of his or her position.” See MPEP 2144.03.

Even still, the Examiner has relied on col. 12, lines 43-53 (see above) from Dehmlow and page 3, col. 1 from Greene to meet applicant’s claimed technique “wherein the updating accelerates a culling of a box since a depth of a nearest corner of the box is farther than the farthest depth value” (see Claim 24). Applicant respectfully disagrees, as the mere mention of culling in Greene does not rise to the level of specificity of the culling “of a box,” as claimed. Further, neither of the references makes any mention of updating a far clipping plane based on the farthest depth value in a z-pyramid for the specific purpose of accelerating the culling of a

-10-

box specifically due to the fact that a depth of a nearest corner of the box is farther than the farthest depth value.

Again, at least the first and third elements of the *prima facie* case of obviousness have not been met, since the Examiner's proposed modification would not be obvious and further the prior art references, when combined, fail to teach or suggest all the claim limitations. A notice of allowance or a specific prior art showing of each of applicant's claimed elements, in combination with the remaining claimed features, is respectfully requested.

Thus, all of the independent claims are deemed allowable. Moreover, the remaining dependent claims are further deemed allowable, in view of their dependence on such independent claims.

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 505-5100. If any fees are due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1351 (Order No. NVIDP224B_P000872).

Respectfully submitted,

Kevin J. Zilka

Registration No. 41,429

P.O. Box 721120
San Jose, CA 95172
Telephone: (408) 505-5100